

# PATENT ABSTRACTS OF JAPAN

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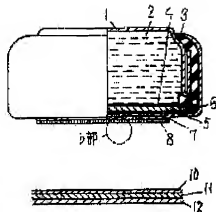
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## (54) SEALING MATERIAL FOR AIR CELL

### (57)Abstract:

**PURPOSE:** To get an air cell where there is no scab of the sealing material caused by hydrogen gas and the deterioration during storage is small by using a sealing material which can discharge a small quantity of hydrogen gas generated in a negative electrode zinc out of the battery, in an low-mercury or mercury free air cell.

**CONSTITUTION:** The thickness of the aluminum layer within a sealing material is regulated to the 0.1-0.6micron. A small quantity of hydrogen gas generated from within the zinc of a negative electrode slips between thin aluminum layers 11, so an air cell where there is no scab of a sealing material, and the deterioration during storage is small can be obtained.



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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the air cell which uses the sealant of an air cell and the air cell which blockaded the air introduction hole by sealant in detail, and this kind of sealant.

[0002]

[Description of the Prior Art]In recent years, a global environmental problem attracts attention and we came to be anxious about the influence which it especially has on the environment of mercury abandonment. It is the cell developed as an alternate power source of a mercury battery, a button form air cell is environment-friendly with low-water-flow silver, and since it has large electric capacity and the outstanding feature of being lightweight, it is developing the demand quickly focusing on the power supply for hearing aid. By development of a large capacity type and a laminated type cell, a use with new power supply, power supply for medical equipment, etc. for pagers is also expanded, and much more growth will be expected from now on.

[0003]The positive active material of an air cell is oxygen in the air. Generally, the air cell has the structure shown in drawing 1 (a), incorporates it from the air introduction hole 8 for the air introduction which provided oxygen in the air in the positive electrode case 8 (a), and is used as positive active material.

[0004]When saving in the state where an air cell is not used, In order to prevent degradation of the battery preservation performance resulting from the electrolysis solution (caustic alkali solution) in a cell evaporating from the air introduction hole 8 (a), or an electrolysis solution absorbing the carbon dioxide in the air, and generating carbonate, The cell was sealed by the large sealant of the gas barrier property which consists of a synthetic resin and an aluminum layer thicker than 0.6 micron.

[0005]

[Problem(s) to be Solved by the Invention]However, mercury is contained in [ of what will be little if it compares also with an air cell at a mercury battery ] negative-electrode zinc. This enlarges zincky hydrogen overpotential and generating of hydrogen gas is controlled, What has big hydrogen overpotential is used as the proposal of the mercury reduction of the negative-electrode zinc which is added for the purpose of reservation of electrical conductivity, and added organic system inhibitor from the position of environmental protection, and zinc dust, and the mercury additive-free proposal by combination with the above-mentioned organic system inhibitor is made. However, although it is some also in these cells, hydrogen gas is emitted within a cell during

preservation. and also it swells the sealant of a cell although the emitted hydrogen gas is some, and it becomes a cause of an appearance defect -- the time of abnormalities -- this internal pressure -- it increases rapidly, and becomes larger than the adhesive strength of jointing of sealant, and exfoliation of jointing arises, and since air invades, a cell carries out degradation consumption.

[0006]In the air cell which used sealant, an object of this invention while controlling bulging of the sealant by the hydrogen gas emitted when the amount of mercury to add is made reduction or additive-free is to prevent degradation of the cell at the time of preservation.

[0007]

[Means for Solving the Problem]In order to solve the above-mentioned technical problem, this invention regulates thickness of an aluminum layer in sealant to 0.1-0.6 micron.

[0008]

[Function]While according to this composition the hydrogen gas which generated the aluminum layer of sealant from the cell passes, reducing the load of the internal pressure to sealant and preventing generating of the appearance defect by bulging of sealant, Exfoliation of jointing of sealant is prevented and the performance degradation of the cell by invasion of the air from an air introduction hole is prevented.

[0009]

[Example]Hereafter, the example of this invention is described with a figure.

[0010]Drawing 1 (a) and (b) is a sectional view of air cell PR2330 (23 mm in diameter, and 3.0 mm in height) of this example, and its sealant.

[0011]In order to prevent loose connection with the terminal of apparatus from fixing sealant to a cell positive electrode case side in the sealant used for the unit cell shown in drawing 1 (b), and an adhesive material remaining in a positive electrode case in the case of sealant removal, and occurring, The aluminum layer was sandwiched with the synthetic resin, lamination was performed, the adhesive material was applied to the synthetic resin surface with comparatively sufficient adhesion with an adhesive material, and it arranges on the cell. In this example, this composition was adopted and the thing with a thickness of 25 microns of polyethylene terephthalate was used as a synthetic resin.

[0012]First, it creates at a time 100 things which changed the thickness of the aluminum layer to 0-1.0 micron, and stuck it on PR2330, and the result of having observed bulging near the vent of sealant after the 60 \*\* 40-day preservation equivalent to the ordinary temperature two-year preservation which is a recommendation term of an air cell is shown in Table 1.

[0013]

[Table 1]

	アルミ層の厚み (μm)									
	0	0.1	0.2	0.3	0.5	0.6	0.7	0.8	1.0	
電池 A (全銀)	0	0	0	0	0	0	15	20	25	
電池 B (全銀3%)	0	0	0	0	0	0	5	15	20	
電池 C (全銀7%)	0	0	0	0	0	0	0	0	0	

[0014]As a used cell, the example in the cell of a non-mercury formula was used as the cell A, and what contains 7% of mercury for what contains 3% of mercury to negative-electrode zinc as an example in a low-water-flow silver formula cell as an example of the cell B and the comparatively large cells of the other amount of mercury was used as the cell C. The number in front is occurrences of bulging checked under 10 times as many microscopes. In the cell C, bulging of sealant was not checked regardless of the thickness of an aluminum layer so that clearly from Table 1. Since the amount of mercury in negative-electrode zinc is contained so much, this is presumed for hydrogen gas generating under preservation to hardly take place. There was the hydrogen gas emitted [ on the other hand ] slightly [ the amount of mercury contained in negative-electrode zinc ] during preservation by zero or few cells A and B, and bulging was checked when the sealant of aluminum layer thickness of 0.7 microns or more was used. Since the hydrogen gas emitted from the negative electrode since the thickness of an aluminum layer was thin fell out from the small hole of sealant, it is presumed that bulging did not occur when the sealant of 0.6 micron or less of aluminum layer thickness was used. By the cell without an aluminum layer, reduction of battery weight considered to be based on evaporation of the steam from the remarkable inside of a cell although there was no bulging by hydrogen gas generating was checked, and the service capacity after preservation became half [ of the initial value ]. The deterioration phenomenon of service capacity did not happen in the sealant which has an aluminum layer of 0.1 microns or more.

[0015]As the synthetic resin films 10 and 12, Polyethylene, polypropylene whose thickness besides this example is 10-200 microns, The effect with same poly olefins fluoridation, such as polyester, such as polyamide of polyolefines, such as a polymethylpentene, nylon 6, 66 and 11, and 12 grades and polybutylene terephthalate, and polytetrafluoroethylene, was acquired.

[0016]The same effect was acquired when the thickness of the used aluminum layer was 0.1-0.6 micron or less, even if it used the composition which carried out multilayer lamination of a synthetic resin and the aluminum layer in addition to the example.

[0017]This invention checked the effect that not only the sealant that has the planar structure but the saccate sealant used for a laminated type air cell was the same.

[0018]

[Effect of the Invention]Since hydrogen gas generated from negative-electrode zinc can be discharged out of a cell if the sealant of this invention is used for the air cell of low-water-flow silver and non-mercury, there is no

bulging of the sealant originating in hydrogen gas generating, and it can be considered as an air cell with small degradation of the cell at the time of preservation.

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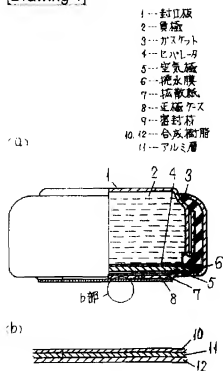
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DRAWINGS

[Drawing 1]



[Translation done.]